Cisco Catalyst 6500 Series 10 Gigabit Ethernet Interface Modules

Product Overview

The Cisco Catalyst® 6500 Series Switches offer a variety of 10 Gigabit Ethernet modules to serve different needs in the campus and data center for enterprise, commercial, and service provider customers: the Cisco Catalyst 6500 16-port 10 Gigabit Ethernet Copper Module, 16-port 10 Gigabit Ethernet Fiber Module, 8-port 10 Gigabit Ethernet Fiber Module, and 4-port 10 Gigabit Ethernet Fiber Module. The copper module supports RJ-45 connectors and provides operational distance of up to 100m over Category 6, 6A, and 7 type cabling. The fiber modules support pluggable optics and provide operational distances of up to 80 km over single-mode fiber and 300m over multimode fiber.

16-Port 10 Gigabit Ethernet Copper Module

The 16-port 10 Gigabit Ethernet copper module (Figure 1) provides up to 130 10 Gigabit Ethernet copper ports in a single Cisco Catalyst 6509 Switch chassis and 260 10 Gigabit Ethernet ports in a Cisco Catalyst 6500 Virtual Switching System (VSS) 1440 and is primarily designed for data center access with a secondary use case for switch-to-switch connectivity. It consists of 4 port groups of 4 ports each. Users can operate each port group in either oversubscription mode (2 to 4 ports used per port group) or performance mode (1 port used per port group), providing the flexibility to use some ports for connection to servers and other ports for interconnection of switches. In performance mode, up to 4 10 Gigabit Ethernet ports can be used to create a virtual switch link in a VSS.[1]

Figure 1. Cisco Catalyst 6500 16-Port 10 Gigabit Ethernet Copper Module

16-Port 10 Gigabit Ethernet Fiber Module

The 16-port 10 Gigabit Ethernet fiber module (Figure 2) provides up to 130 10 Gigabit Ethernet ports in a single Cisco Catalyst 6509 chassis and 260 10 Gigabit Ethernet ports in a VSS and is designed for LAN campus aggregation and data center access, where fanout and port density are very important. It consists of 4 port groups of 4 ports each. Users can operate each port group in either oversubscription mode (2 to 4 ports used per port group) or performance mode (1 port used per port group), providing the flexibility to use some ports for connection to servers in performance mode and others for uplinks to wiring closets in oversubscription mode. In performance mode, up to 4 10 Gigabit Ethernet ports can be used to create a virtual switch link in a VSS.[2] In addition, the 16-port

[1] Cisco Catalyst 6500 16-port 10 Gigabit Ethernet Copper Module support in a VSS will be introduced in Cisco IOS Software Release 12.2(33)SXI5. Virtual switch link support on the Cisco Catalyst 6500 16-port 10 Gigabit Ethernet Copper Module will also be introduced in Cisco IOS Software Release 12.2(33)SXI5.
[2] Cisco Catalyst 6500 16-port 10 Gigabit Ethernet Fiber Module support in a VSS is available in Cisco IOS Software Release 12.2(33)SXH2. Virtual switch link support on the Cisco Catalyst 6500 16-port 10 Gigabit Ethernet Fiber module will be available in Cisco IOS Software Release 12.2(33)SXI.

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10 Gigabit Ethernet module has reduced power consumption. It uses half the power per port of the 8-port 10 Gigabit Ethernet module, providing substantial power savings to the customer.

Figure 2. Cisco Catalyst 6500 16-Port 10 Gigabit Ethernet Fiber Module

8-Port 10 Gigabit Ethernet Fiber Module

The 8-port 10 Gigabit Ethernet fiber module (Figure 3) provides up to 66 10 Gigabit Ethernet ports in a single Cisco Catalyst 6509 chassis and 132 10 Gigabit Ethernet ports in a VSS. It supports 64 Gbps of local switching, making it ideal for deployment in the core or aggregation layer of LAN campuses and data centers. All 8 ports can be used to create a virtual switch link in a VSS.

Figure 3. Cisco Catalyst 6500 8-Port 10 Gigabit Ethernet Fiber Module

4-Port 10 Gigabit Ethernet Fiber Module

The 4-port 10 Gigabit Ethernet fiber module (Figure 4) has no oversubcription and is designed for deployments in which line rate is important. It provides up to 34 10 Gigabit Ethernet ports in a single Cisco Catalyst 6509 chassis and 68 10 Gigabit Ethernet ports in a VSS.

Figure 4. Cisco Catalyst 6500 4-Port 10 Gigabit Ethernet Fiber Module

Module Interoperability

All four modules are interoperable with the Cisco Catalyst 6500 Series Virtual Switching Supervisor Engine 720 with 10GE uplinks and the Cisco Catalyst 6500 Series Supervisor Engine 720 and provide 40-Gbps connection to the switch fabric. Building on the award-winning Cisco Catalyst 6500 Series, these 10 Gigabit Ethernet modules are backward compatible with all existing Cisco Catalyst 6500 Series line cards and services modules, enabling

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enterprises and service providers to offer new Layer 2 through 7 services and network capabilities to increase revenue and user productivity without the need for major equipment upgrades.

The Cisco Catalyst 6500 Series 10 Gigabit Ethernet modules are designed for deployment in the distribution and core of the campus and data center for traffic aggregation, or for interbuilding, points of presence (POPs), WAN edge, and metropolitan area network (MAN) connections. These modules support IEEE 802.3ad link aggregation and Cisco® distributed EtherChannel technology for fault-tolerant connectivity and bandwidth scalability of up to 80 Gbps per EtherChannel connection using any 8 ports in the same chassis. In addition, they support hardware-based multicast replication, quality of service (QoS), access control lists (ACLs), jumbo frames, and low latency to enable secure and predictable performance for bandwidth-intensive applications.

Applications

- 16-port 10 Gigabit Ethernet copper module: Data center access and switch-to-switch connectivity
- 16-port 10 Gigabit Ethernet fiber module: LAN campus and data center distribution and data center access, where fanout and port density are important
- 8-port 10 Gigabit Ethernet fiber module: Data center core and distribution, LAN campus core and distribution, and service providers
- 4-port 10 Gigabit Ethernet fiber module: Core, interbuilding connections, POPs, WAN edge, and MAN connections, where no oversubscription and medium to low 10 Gigabit Ethernet density is required

For more information, see the white paper discussing 10 Gigabit Ethernet switching for enterprises at http://www.cisco.com/en/US/products/hw/switches/ps708/products_white_paper0900aecd802a648b.shtml.

Main Features and Benefits

Table 1 summarizes the primary features and benefits of the Cisco Catalyst 6500 Series 10 Gigabit Ethernet modules.

Table 1. Cisco Catalyst 6500 Series 10 Gigabit Ethernet Modules Primary Features Comparison

Feature	4-Port 10GbE Fiber Module	8-Port 10GbE Fiber Module	16-Port 10GbE Fiber Module	16-Port 10GbE Copper Module
Ports	4	8	16	16
Optics	XENPAK	X2	X2	• No optics • Copper (RJ-45) connectors
Switch fabric connection	40 Gbps (80 Gbps full duplex)	40 Gbps (80 Gbps full duplex)	40 Gbps (80 Gbps full duplex)	40 Gbps (80 Gbps full duplex)
Oversubscription	1:1	2:1	4:1	4:1
Forwarding engine	• Default: Centralized forwarding card (CFC) • Optional: Distributed forwarding card with DFC3A, DFC3B, DFC3BXL, DFC3C, or DFC3CXL	• WS-X6708-10G-3C: equipped with DFC3C for distributed forwarding, supporting 256,000 routes • WS-X6708-10G-3CXL: equipped with DFC3CXL for distributed forwarding, supporting 1 million routes	• WS-X6716-10G-3C: equipped with DFC3C for distributed forwarding, supporting 256,000 routes • WS-X6716-10G-3CXL: equipped with DFC3CXL for distributed forwarding, supporting 1 million routes	• WS-X6716-10GT-3C: equipped with DFC3C for distributed forwarding, supporting 256,000 routes • WS-X6716-10GT-3CXL: equipped with DFC3CXL for distributed forwarding, supporting 1 million routes
Queues	• Receive: 8q8t • Transmit: 1p7q8t	• Receive: 8q4t • Transmit: 1p7q4t	Oversubscription mode: • Receive: 1p7q2t per port • Transmit: 1p7q4t per port group Performance mode: • Receive: 8q4t per port • Transmit: 1p7q4t per port	Oversubscription mode: • Receive: 1p7q2t per port • Transmit: 1p7q4t per port group Performance mode: • Receive: 8q4t per port • Transmit: 1p7q4t per port
Queuing mechanisms	• Class of service (CoS)–based queue mapping	• CoS-based queue mapping • Differentiated services code point (DSCP)–based queue mapping	• CoS-based queue mapping • DSCP-based queue mapping	• CoS-based queue mapping • DSCP-based queue mapping

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Scheduler	• Deficit Weighted Round Robin (DWRR) • Weighted Random Early Detection (WRED)	• DWRR • WRED • Shaped Round Robin (SRR) at egress	Oversubscription mode: • DWRR • WRED Performance mode: • DWRR • WRED • SRR at egress	Oversubscription mode: • DWRR • WRED Performance mode: • DWRR • WRED • SRR at egress
Port buffers	16 MB per port	200 MB per port	Oversubscription mode: • 90 MB per port group Performance mode: • 200 MB per port	Oversubscription mode: • 90 MB per port group Performance mode: • 200 MB per port
Hardware-based multicast replication	• Ingress and egress • Approximately 20 GB per replication engine • 2 replication engines per module	• Ingress and egress • Approximately 50 GB per replication engine • 2 replication engines per module	• Ingress and egress • Approximately 50 GB per replication engine • 2 replication engines per module	• Ingress and egress • Approximately 50 GB per replication engine • 2 replication engines per module
Jumbo frame support for bridged and routed packets	Up to 9216 bytes	Up to 9216 bytes	Up to 9216 bytes	Up to 9216 bytes
Maximum port density per chassis	34 ports (9-slot chassis)	66 ports (9-slot chassis)	130 ports (9-slot chassis)	130 ports (9-slot chassis)
Maximum port density per VSS	68 ports	132 ports	260 ports	260 ports
Can be used to form virtual switch link	No	Yes	• Performance mode: Yes (supported in a subsequent software release) • Oversubscription mode: No	• Performance mode: Yes (supported in a subsequent software release) • Oversubscription mode: No
Supervisor engines supported	Cisco Catalyst 6500 Series Virtual Switching Supervisor Engine 720 with 10GE uplinks or Supervisor Engine 720 with any policy feature card (PFC; chassis will work in lowest common denominator mode)	Cisco Catalyst 6500 Series Virtual Switching Supervisor Engine 720 with 10GE uplinks or Supervisor Engine 720 with any PFC (chassis will work in lowest common denominator mode)	Cisco Catalyst 6500 Series Virtual Switching Supervisor Engine 720 with 10GE uplinks or Supervisor Engine 720 with any PFC (chassis will work in lowest common denominator mode)	Cisco Catalyst 6500 Series Virtual Switching Supervisor Engine 720 with 10GE uplinks or Supervisor Engine 720 with any PFC (chassis will work in lowest common denominator mode)
Chassis supported	• Any Cisco Catalyst 6500 E-Series chassis, C6509-NEB-A chassis, non-E-Series chassis with fan tray 2, or Cisco 7600 Series or 7600-S Series chassis (NEBS compliant: operating temperature up to 55°C) • Not supported in Cisco Catalyst 6503 non-E Series chassis	• Any Cisco Catalyst 6500 E-Series chassis, including 6503-E, 6504-E, 6506-E, 6509-E, 6509-V-E, and C6509-NEB-A chassis with dual fan tray, or the Cisco 7604, 7609 with dual fan tray, or 7600-S Series chassis (NEBS compliant: operating temperature up to 55°C), or; • Non-E-Series chassis with fan tray 2, including Cisco Catalyst 6506, 6509, 6513, and C6509-NEB-A with single fan tray or the Cisco 7606, 7613, and 7609 chassis with single fan tray (non-NEBS compliant: operating temperature up to 40°C) • Not supported in Cisco Catalyst 6503 non-E Series chassis	• Any Cisco Catalyst 6500 E-Series chassis, including 6503-E, 6504-E, 6506-E, 6509-E, 6509-V-E, and C6509-NEB-A chassis with dual fan tray (NEBS compliant: operating temperature up to 55°C), or; • Non-E-Series chassis with fan tray 2, including Cisco Catalyst 6506, 6509, 6513, and C6509-NEB-A with single fan tray (non-NEBS compliant: operating temperature up to 40°C) • Not supported in Cisco Catalyst 6503 non-E Series chassis and 7600 Series chassis	• Any Cisco Catalyst 6500 E-Series chassis, including 6503-E, 6504-E, 6506-E, 6509-E, 6509-V-E, and C6509-NEB-A chassis with dual fan tray (NEBS compliant: operating temperature up to 55°C), or: • Non-E-Series chassis with fan tray 2, including Cisco Catalyst 6506, 6509, 6513, and C6509-NEB-A with single fan tray (non-NEBS compliant: operating temperature up to 40°C) • Not supported in Cisco Catalyst 6503 non-E Series chassis and 7600 Series chassis
Slot requirements	• Can occupy any slot in any Cisco Catalyst 6503-E, 6504-E, 6506, 6506-E, 6509, 6509-E, 6509-V-E, or 6509-NEB-A chassis; or Cisco 7604, 7607, 7609, or 7600-S Series chassis • Can occupy only slots 9 through 13 in a Cisco Catalyst 6513 or Cisco 7613 chassis	• Can occupy any slot in any Cisco Catalyst 6503-E, 6504-E, 6506, 6506-E, 6509, 6509-E, 6509-V-E, or 6509-NEB-A chassis; or Cisco 7604, 7606, 7609, or 7600-S Series chassis • Can occupy only slots 9 through 13 in a Cisco Catalyst 6513 or Cisco 7613 chassis	• Can occupy any slot in any Cisco Catalyst 6503-E, 6504-E, 6506, 6506-E, 6509, 6509-E, 6509-V-E, or 6509-NEB-A chassis • Can occupy only slots 9 through 13 in a Cisco Catalyst 6513 chassis	• Can occupy any slot in any Cisco Catalyst 6503-E, 6504-E, 6506, 6506-E, 6509, 6509-E, 6509-V-E, or 6509-NEB-A chassis • Can occupy only slots 9 through 13 in a Cisco Catalyst 6513 chassis

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Onboard memory	256 MB default, upgradable to 512 MB or 1 GB	1 GB default	1 GB default	1 GB default

The 16-port 10 Gigabit Ethernet copper line cards support Category 6, 6A, and 7 type cabling.

The 8-port and 16-port 10 Gigabit Ethernet fiber line cards support the Cisco 10GBASE-CX4, -SR, -LRM, -LX4, -LR, and -ER X2 modules.

The 4-port fiber line card supports the Cisco 10GBASE-CX4, -SR, -LRM, -LX4, -LR, -ER, -ZR, -DWDM, -WDM-REC, and -LW XENPAK modules.

XENPAK and X2 of the same type (for example, XENPAK SR and X2 SR) can be connected to each other.

Table 2 summarizes pluggable optics supported on the Cisco Catalyst 6500 Series 10 Gigabit Ethernet modules.

Table 2. Pluggable Optics for Cisco Catalyst 6500 Series 10 Gigabit Ethernet Modules

X2 Part Number	XENPAK Part Number	Transceiver Type	Wavelength	IEEE Standard	Maximum Distance and Cable Type[3]
X2-10GB-LRM	XENPAK-10GB-LRM	10GBASE-LRM	1310 nm serial	IEEE 802.3aq	220m over multimode fiber
X2-10GB-SR[6]	XENPAK-10GB-SR	10GBASE-SR	850 nm serial	IEEE 802.3ae	• 26m over 62.5-micron FDDI-grade multimode fiber • 33m over 62.5-micron 200 MHz x km multimode fiber • 66m over 50-micron 400 MHz x km multimode fiber • 82m over 50-micron 500 MHz x km multimode fiber • 300m over 50-micron 2000 MHz x km multimode fiber
X2-10GB-LR[6]	XENPAK-10GB-LR+	10GBASE-LR	1310 nm serial	IEEE 802.3ae	10 km over single-mode fiber
X2-10GB-ER[6]	XENPAK-10GB-ER+	10GBASE-ER	1550 nm serial	IEEE 802.3ae	40 km over single-mode fiber[4]
X2-10GB-LX4[6]	XENPAK-10GB-LX4	10GBASE-LX4	WWDM 1310 nm	IEEE 802.3ae	• 300m over 62.5-micron FDDI grade multimode fiber • 240m over 50-micron 400 MHz x km multimode fiber • 300m over 50-micron 500 MHz x km multimode fiber
X2-10GB-CX4[5]	XENPAK-10GB-CX4	10GBASE-CX4	Copper	IEEE 802.3ak	15m over 8 pair 100-Ohm InfiniBand cable
ZR X2 not available today	XENPAK-10GB-ZR	10GBASE-ZR	1550 nm serial	–	80 km over single-mode fiber
DWDM X2 not available today	DWDM-XENPAK-xx.yy	DWDM	32 different wavelengths; C band	100 GHz ITU grid	32 wavelengths over single strand of single-mode fiber; 80 km[6]
RX only WDM X2 not available today	WDM-XENPAK-REC	Receive only WDM	1530-1565 nm	–	Receive only; no transmission; 80 km over single-mode fiber
LW X2 not available today	XENPAK-10GB-LW	10GBASE-LW	1310 nm serial	IEEE 802.3ae	10 km over single-mode fiber

[3] To calculate the exact distances that your module will support before installation, see optical specifications in the XENPAK and X2 data sheets. The exact distance supported varies according to the number of splices and connectors in a single-mode fiber strand.
- Cisco 10GBASE XENPAK modules data sheet
- Cisco 10GBASE X2 modules data sheet
- Cisco 10GBASE DWDM XENPAK modules data sheet

[4] According to the IEEE 802.3ae standard, requires 5 dB 1550 nm fixed loss attenuator for <20 km; a 5 dB fixed loss attenuator is available as a spare (part number WS-X6K-5DB-ATT=).
[5] To comply with EMI, version -02 or later of SR, LR, ER, LX4, and CX4 X2 optics are required for WS-X6708-10G-3C and WS-X6708-10G-3CXL; and version -02 or later of SR and CX4, version -03 or later of ER, and version -04 or later of LR and LX4 X2 optics are required for WS-X6716-10G-3C and WS-X6716-10G-3CXL. This restriction does not apply to LRM. See release the notes or external Q&A for more details.
[6] Any passive multiplexer and demultiplexer can be used with the DWDM XENPAKs. The Cisco ONS 15216 Flexlayer filters are one of the options.

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Product Specifications

Table 3 lists product specifications of the Cisco Catalyst 6500 Series 10 Gigabit Ethernet modules.

Table 3. Product Specifications

Product	Specifications
Standard protocols	IEEE 802.1d, IEEE 802.1p, IEEE 802.1q, IEEE 802.1s, IEEE 802.1w, IEEE 802.3x, IEEE 802.3ad, IEEE 802.3ae, IEEE 802.3ak, IEEE 802.3aq, and IEEE 802.3an
Physical specifications	• Occupies one slot in the Cisco Catalyst 6500 Series chassis or Cisco 7600 Series chassis • Dimensions (H x W x D): 1.2 x 14.4 x 16 in. (3.0 x 35.6 x 40.6 cm) • Weight: ◦ Cisco Catalyst 6708 and 6716: 13 pounds excluding X2 components; ¼ pound for each X2 ◦ Cisco Catalyst 6704: 10 pounds excluding XENPAK and DFC components; 2/3 pound for each XENPAK
Environmental conditions	Operating temperature: • Agency-certified for operation: 32 to 104°F (0 to 40° C) • Design and tested for operation 32 to 130°F (0 to 55° C) • Storage temperature: –40 to 167°F (–40 to 75°C) • Relative humidity: 10 to 90 percent, noncondensing Operating altitude: • Agency-certified for operation: –500 to 6500 ft (–150 to 2000m) • Designed and tested for operation –500 to 10000 ft (–150 to 3000m)
Regulatory compliance	Cisco Catalyst 6500 Series 10 Gigabit Ethernet modules, when installed in a system, comply with the following EMC and safety standards: EMC Standards: • FCC Part 15 (CFR 47) Class A • ICES-003 Class A • VCCI Class A • EN55022 Class A • EN55024 • CISPR24 • CISPR 22 Class A • AS/NZS CISPR 22 Class A • ETS 300 386 • KN 22 Class A • EN 50082-1 • EN61000-3-2 • EN61000-3-3 • EN61000-6-1 • CNS13438 Class A • KN6100 -4 Series Safety Standards: • UL 60950-1 • CAN/CSA C22.2 No. 60950 • EN 60950-1 • IEC 60950-1 • AS/NZS 60950-1 • IEC 60825 Class 1 • EN 60825 Class 1 • 21CFR 1040
NEBS criteria levels	SR-3580 Issue 3, June 2007 (GR-63-CORE, issue 3, and GR-1089-CORE, issue 4)
ETSI	• ETS 300 019-2-1, Class 1.1 Storage • ETS 300 019-2-2, Class 2.1 and 2.2 Transportation • ETS 300 019-2-3, Class 3.1E Stationary Use

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Network management	• ETHERLIKE-MIB (RFC 1643) • IF-MIB (RFC 1573) • Bridge MIB (RFC 1493) • CISCO-STACK-MIB • CISCO-VTP-MIB • CISCO-CDP-MIB • RMON MIB (RFC 1757) • CISCO-PAGP-MIB • CISCO-STP-EXTENSIONS-MIB • CISCO-VLAN-BRIDGE-MIB • CISCO-VLAN-MEMBERSHIP-MIB • ENTITY-MIB (RFC 2037) • HC-RMON • RFC1213-MIB (MIB-II) • SMON-MIB
Power requirements	• WS-X6716-10GT-3C: 509.3W (12.1A @ 42V) • WS-X6716-10GT-3CXL: 538.7W (12.8A @ 42V) • WS-X6716-10G-3C: 457.8W (10.9A @ 42V) • WS-X6716-10G-3CXL: 487.2W (11.6A @ 42V) • WS-X6708-10G-3C: 444.36W (10.58A @ 42v) • WS-X6708-10G-3CXL: 473.76w (11.28A @ 42V) • WS-X6704-10GE with DFC3CXL: 362.46W (8.63A @ 42V) • WS-X6704-10GE with DFC3C: 333.06W (7.93A @ 42V) • WS-X6704-10GE with DFC3BXL: 402.36W (9.58A @ 42V) • WS-X6704-10GE with DFC3B: 377.16W (8.98A @ 42V) • WS-X6704-10GE with DFC3A: 389.76W (9.28A @ 42V) • WS-X6704-10GE with CFC: 295.26W (7.03A @ 42V) • Go to http://www.cisco.com/go/powercalculator for easy power consumption calculation.
Indicators	• Status: green (operational), red (faulty), and orange (module booting) • Link: green (port enabled and connected), orange (port disabled), and off (port enabled and not connected)

Ordering Information

Table 4 gives ordering information.

Table 4. Part Numbers for Ordering

Part Numbers	Description
10 Gigabit Ethernet Modules	
WS-X6716-10GT-3C	Cisco Catalyst 6500 16-Port 10 Gigabit Ethernet Copper Module with DFC3C
WS-X6716-10GT-3CXL	Cisco Catalyst 6500 16-Port 10 Gigabit Ethernet Copper Module with DFC3CXL
WS-X6716-10G-3C	Cisco Catalyst 6500 16-Port 10 Gigabit Ethernet Module with DFC3C, requires X2
WS-X6716-10G-3CXL	Cisco Catalyst 6500 16-Port 10 Gigabit Ethernet Module with DFC3CXL, requires X2
WS-X6708-10G-3C	Cisco Catalyst 6500 8-Port 10 Gigabit Ethernet Module with DFC3C, requires X2
WS-X6708-10G-3CXL	Cisco Catalyst 6500 8-Port 10 Gigabit Ethernet Module with DFC3CXL, requires X2
WS-X6704-10GE	Cisco Catalyst 6500 4-Port 10 Gigabit Ethernet Module, requires XENPAK
Distributed Forwarding Card Upgrades	
WS-F6700-DFC3CXL	Distributed Forwarding Card-3CXL
WS-F6700-DFC3C	Distributed Forwarding Card-3C
WS-F6700-DFC3BXL	Distributed Forwarding Card-3BXL
WS-F6700-DFC3B	Distributed Forwarding Card-3B
WS-F6700-DFC3A	Distributed Forwarding Card-3A
X2 Optics	
X2-10GB-LRM	10GBASE-LRM X2 (multimode fiber)

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X2-10GB-SR	10GBASE-SR X2 (multimode fiber)
X2-10GB-LR	10GBASE-LR X2 (single-mode fiber)
X2-10GB-ER	10GBASE-ER X2 (single-mode fiber)
X2-10GB-LX4	10GBASE-LX4 X2 (multimode fiber)
X2-10GB-CX4	10GBASE-CX4 X2 (copper InfiniBand cable)
XENPAK Optics	
XENPAK-10GB-LRM	10GBASE-LRM XENPAK (multimode fiber)
XENPAK-10GB-SR	10GBASE-SR XENPAK (multimode fiber)
XENPAK-10GB-LR+	10GBASE-LR XENPAK (single-mode fiber)
XENPAK-10GB-ER+	10GBASE-ER XENPAK (single-mode fiber)
XENPAK-10GB-LX4	10GBASE-LX4 XENPAK (multimode fiber)
XENPAK-10GB-CX4	10GBASE-CX4 XENPAK (copper InfiniBand cable)
XENPAK-10GB-ZR	10GBASE-ZR XENPAK (single-mode fiber)
DWDM-XENPAK-xx.yy	DWDM XENPAK, where xx.yy ranges from 30.33 to 60.61 (single-mode fiber)
WDM-XENPAK-REC	RX only XENPAK (single-mode fiber)
XENPAK-10GB-LW	10GBASE-LW XENPAK (single-mode fiber) (WAN PHY)
Cabling for CX4 Transceivers	
CAB-INF-28G-1=	Cisco 1m CX4 patch cable for XENPAK-10GB-CX4
CAB-INF-28G-5=	Cisco 5m CX4 patch cable for XENPAK-10GB-CX4
CAB-INF-28G-10=	Cisco 10m CX4 patch cable for XENPAK-10GB-CX4
CAB-INF-26G-15=	Cisco 15m CX4 patch cable for XENPAK-10GB-CX4

Note:

- 16-port 10 Gigabit Ethernet copper module:
  - WS-X6716-10GT-3C ships with WS-X6716-10GT and WS-F6700-DFC3C.
  - WS-X6716-10GT-3CXL ships with WS-X6716-10GT and WS-F6700-DFC3CXL.
  - The front panel of these modules is labeled WS-X6716-10GT.
  - Cisco IOS® Software commands display WS-X6716-10GT with either WS-F6700-DFC3C or WS-F6700-DFC3CXL.
- 16-port 10 Gigabit Ethernet fiber module:
  - WS-X6716-10G-3C ships with WS-X6716-10GE and WS-F6700-DFC3C.
  - WS-X6716-10G-3CXL ships with WS-X6716-10GE and WS-F6700-DFC3CXL.
  - The front panel of these modules is labeled WS-X6716-10GE.
  - Cisco IOS Software commands display WS-X6716-10GE with either WS-F6700-DFC3C or WS-F6700-DFC3CXL.
- 8-port 10 Gigabit Ethernet fiber module:
  - WS-X6708-10G-3C ships with WS-X6708-10GE and WS-F6700-DFC3C.
  - WS-X6708-10G-3CXL ships with WS-X6708-10GE and WS-F6700-DFC3CXL.
  - The front panel of these modules is labeled WS-X6708-10GE.
  - Cisco IOS Software commands display WS-X6708-10GE with either WS-F6700-DFC3C or WS-F6700-DFC3CXL.

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Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare the network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, see Cisco Technical Support Services or Cisco Advanced Services.

For More Information

For more information about Cisco Catalyst 6500 Series Switches, visit http://www.cisco.com/en/US/products/hw/switches/ps708/index.html or contact your local account representative.

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